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Forest Pest Management

Pacific Southwest Region



FPM Report NE98-4

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Insect and Disease Conditions at Butte Lake Campground Lassen Volcanic National Park

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Introduction

At the request of John Arnold, Forester at Lassen Volcanic National Park, USFS Forest Pest Management (FPM) evaluated the insect and disease conditions at Butte Lake Campground on June 15-17. The purpose was to assess the condition of the trees and to offer alternative management strategies for the campground.

This is not a comprehensive hazard tree evaluation. Some of the trees with defects (i.e. potential hazard trees) are listed in the "Field Observations" which are attached to this report. The Park staff should perform a detailed hazard tree survey to locate any other dangerous trees that exist in the area. We recommend that the Park prepares a hazard tree management plan for Butte Lake Campground. The purpose of this plan would be to establish a program whereby each year highly hazardous trees are identified and treated and a record of tree defects and treatments is maintained. A record of tree failures should be included also. FPM can provide technical information and advice on hazard tree management as needed.



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NORTHEASTERN CALIFORNIA SHARED SERVICE AREA

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Observations (Specific tree problems are listed on pages 4-8)

Butte Lake Campground is situated in a forest of large diameter ponderosa pine and Jeffrey pine. A few young pines can be found throughout, singularly or in clumps. Occasional white fir and lodgepole pine are present. The understory is almost void of small pine regeneration or shrubs. The forest is growing on soil composed mostly of volcanic cinders. This soil provides a weak anchor for the large trees. Large windthrown pine and forked or broken topped trees are common in and around the campground. Strong winds from Butte Lake, the barren lava flows and the cinder cone volcano, located southwest of the campground, intensify as they channel between Prospect and Sunrise Peaks on either side of the campground. Most of the windthrow and breakage in the area fall towards the north or east. A December 1995 windstorm caused much of the currently observed failures. A few old, forked pines growing are evidence that strong windstorms have occurred in the past. There are a number of large pines with varying degrees of lean.

Two dominant site trees were measured to aid in determining the quality and productivity of the site. The first was a 64 year old ponderosa pine with a height of 50 feet and a DBH of 12.3 inches. The second was a 75 year old ponderosa pine with a height of 75 feet and a DBH of 21.5. The Dunning Site Index for these pine is 40 and 50 and the US Forest Service Region 5 Site Classes are 4 and 3, respectively. Stand density was measured in three locations. Basal areas of 80, 140 and 180 square feet per acre were recorded. The normal basal area for this area is between 185 and 195 square feet per acre. Denser stocking can result in stress on the trees, especially during prolonged periods of below normal precipitation.

No current bark beetle-related tree mortality was observed in Butte Lake Campground. There is a limited amount of mortality from bark beetles in the underburn area northeast of the day use area. Most of the mortality in the burn area is from fire-related injuries. Bark beetle mortality in the future will likely coincide with the next protracted drought period. It was noted that some of the tops from broken trees were cut into firewood and stacked up against green trees. This practice is not recommended since the freshly cut wood can attract pine engravers which may attack and kill green trees.

There are large number of ponderosa and Jeffrey pine trees infected with elytroderma disease caused by the fungal pathogen Elytroderma deformans. Initially infecting the needles, this disease becomes established in the wood and then kills year-old needles in subsequent years. Over a long period, infections can result in brooming. Most of the infections at Butte Lake CG are not seriously affecting tree vigor and only a few of the larger pines contain elytroderma brooms.

A group of mature ponderosa pines about 200 feet upslope from the day-use area parking lot are heavily infested with dwarf mistletoe, Arceuthobium campylopodum. An additional few trees east of the parking lot were infected as well. Dwarf mistletoe is weakening the heavily infested trees and has already contributed to some pine mortality in this area.

A small number of decayed roots were found on some of the roots of the windthrown pine. Armillaria root disease is probably one of the pathogens involved. Jon Arnold found rhizomorphs growing under the bark on one of the pine trees that the Park crew fell subsequent to FPM's visit. Armillaria spp. is a pathogen of forest trees in the West that commonly produces rhizomorphs. The few decayed roots observed on the fallen trees at Butte Lake Campground were not enough to cause the tree failures

although the decay is a contributing factor. The strong wind blowing against the large crowns of exposed trees that are weakly rooted in the granular soil is the prime cause the windthrow.

A number of large old pines with thin foliage and branch dieback are scattered throughout the campground. These trees most likely are infected with root disease. They also may be suffering from a lack of soil moisture.

Discussion

Overall, the tree health at Butte Lake Campground is good. Windthrow-related damage is the worst condition observed. Root disease, elythroderma and dwarf mistletoe are present, but not serious. A few hazardous dead or leaning trees were present in June, but many of these have been subsequently removed by Park personnel. For a listing of specific observations, see pp. 4-8.

There are a considerable number of large wind-thrown pine in and around Butte Lake CG. Strong winds, the size of the trees and the nature of the soil are the main reasons for this. Root disease is a contributing factor and is killing some of the roots. Armillaria root disease is probably one of the pathogens responsible since rhizomorphs were observed, but no other root disease pathogen was isolated from the roots that were sampled. Root death may be responsible for the thin foliage and branch death observed in some of the scattered old pines. The trees with the thinnest crowns most likely have the most root disease. Trees with thin crowns should be monitored to detect bark beetle activity which can indicate reduced vigor and future mortality. Thin foliage in the old pines may also be caused by low soil moisture.

The brooms caused by elythroderma disease can become very large and hazardous in the event one should fall on people or property. Tent pads, picnic tables or parking should not be located under large brooms (or other defective branches). Moderate to severe elythroderma infections reduce tree growth and vigor and thus, predispose the host to other diseases and bark beetle attack. Brooms and infected branches can be pruned from trees to eliminate hazards and to increase tree vigor.

Heavy dwarf mistletoe infection reduces tree growth and vigor and thus predisposes the host to other diseases and bark beetle attack. Pruning brooms and infected branches from trees can increase tree vigor. Pruning also removes overstory dwarf mistletoe which can spread seed and infect pine regeneration in the understory. FPM dollars can be requested to fund dwarf mistletoe pruning as well as other pest prevention or suppression projects.

Tree hazards should be identified and removed prior to opening the campground each year. Dead and leaning trees, broken tops and hanging limbs, are hazards that were observed at Butte Lake Campground. Because of the weak soil, high winds and root disease, all the trees should be monitored for increasing lean. Raised soil and/or cracks in the soil at the base of a tree indicates that the tree is likely to fail.

As stated earlier, the health of the trees at Butte Lake Campground is generally good. Many of the tree hazards that were observed have since been removed. If the Park has questions about specific hazards in years to come, we are available to help. We can also assist with developing any pest prevention projects the Park is interested in. If you have any questions, please contact Sheri Smith at 252-6667 or Bill Woodruff at 252-6680.

Field Observations

Butte Lake Campground, Lassen Volcanic National Park

LOOP A - Mostly JP, some large white fir >45 in. dbh, some lodgepole.

Campsite (CS) #1 Before CS #1, there are two trees growing together, fire scar at base. (Drilled 10" in at base 3 times in and around scar and found no rot) JP across from CS 1 and 2 has yellowing needles and brooms.

CS #4 Small top-killed pine with yellowing needles has elythroderma disease.

CS #5 Two leaning trees -lean is toward restroom and recycling center. Large PP with powerline attached was forked. One large fork came down in the recent windstorm. The remaining fork is weak and needs to be removed. Firewood stacked between trees - ok, as long as the trees are not green, otherwise could attract Ips pini into cut wood and also into standing trees.

CS #9 Large forked lodgepole pine (27" dbh x 115') with very thin crown. Thinning crown may indicate possible root disease.

CS #10 Needle discoloration in the pines from elythroderma disease.

CS #12 Stunted lodgepole pine near the picnic table. Cored into base but could not find rot. Appears to be western gall rust. Some borers in dead tree.

CS #13 Broken top with new top.

CS #14 Some needle discoloration and brooming. Large JP has one large windthrown fork on the ground. The other fork is weak and needs to be removed. 23" dbh JP with broken top is dying. Elythroderma is present.

CS #16 On edge of campsite, large JP with fire scar and poor needle retention. Also, lodgepole pine with poor needle retention. Leaning tree appears to have failing roots by the humped soil. Remove. Also large (0.75 inches long) ants entering tree and there is sawdust at the base of the scar.

CS #17 Needle discoloration in pines. Old JPB-related mortality.

CS #18 180 sq. ft. basal area/acre.

CS #19 Tree failure. Had JPB and root disease. Soil provides a weak anchor for the trees in this area.

CS #20 Large pine with several tops. This tree has a large mound of litter around base. If a fire burned this litter, it would likely kill the cambium and tree.

CS #21 - #22 Tree failure. JPB.

CS #23 Leaner and a small dying pine. Ground lifting at base of tree indicates root failure.

CS #24 Needle discoloration and brooming. Elytroderma.

CS #26 Pine near fire pit has decay at base - looks like another tree was growing with it. Thinning crown could be an indicator of root disease. Tree leans toward table and fire ring. Move these "targets".

CS #28 Dead JP.

CS #29 - #30 Needle discoloration and brooming. Elytroderma.

CS #31 Large broken branch on pine. Widow maker. Thin crown could indicate root disease. This tree leans towards CS #28.

CS #33 Two small JPB killed trees, < 8 in dbh. Needle discoloration and brooming in larger pines. Elytroderma. Thinning crowns in group of four PP may indicate root disease. Some PP leaning slightly.

Between CS #35 and #37 Pine with poor needle retention - it is the one with the picnic table leaning against it. Thin crowns indicate possible root disease.

LOOP B

CS #43 Two trees growing together with fire scar at base. Tree failure of large JP. JPB and Ips emarginatus. Failed tree has root disease. Dying crowns of other pine indicate probable root disease. Leaning tree opposite #43, leaning toward road.

CS #45 Thinning crowns indicate possible root disease.

CS #49 Dead branch hanging down over large open area.

CS #47 Thinning crowns in pines indicate possible root disease.

CS #48 Leaner with fire scar. Thinning crowns in pines indicate possible root disease.

CS #49 Tree with large fire scar.

CS #58 Tree failure. JPB and I.e. Thinning crowns in large pines indicate possible root disease.

CS #59 Needle discoloration in 10 in dbh pine.

CS #61 Large pine with 25 ft. dead top. Needle discoloration and brooming. Elytroderma. Tree discoloration near service facility. Elytroderma.

CS #68 Needle discoloration and brooming. Elytroderma. Fire scar in 54 in dbh pine looks sound.

Across rd. from CS #69 - deformed pine with fire scar - 24 in dbh. Thinning crowns in pine indicate possible root disease.

CS #75 and #77 Thinning crowns in pines indicate possible root disease.

CS #78 Dead stob near post maker. Several failed trees. Four > 40 in dbh. JPB and I.e. Standing dead snag beyond failed trees. No indication of root disease found. Probable failure due to weak soil and strong winds.

CS #79 One failed tree. No large roots with root disease.

Between CS #78 and #81 Leaner with fire scar.

CS #81 Thinning crowns in pine indicate possible root disease.

Between CS #80 and #62 Tree with multiple tops.

CS #82 and #83 Needle discoloration and brooming. Elytroderma. Thinning crowns in pine indicate possible root disease. CS #83 has some PP regeneration which can be favored by removing large PP with thin crowns.

Tree failure between #82 and cut off road. Also, snapped off top in 8 in dbh pine.

In from CS #83 Pine with dead top.

CS #87 Tree with fire scar leaning toward building, has a 1 sided crown.

CS #89 Dead tree behind picnic table.

CS #90 Large pine with 2 tops and fire scar leaning toward road - it's the tree with the firewood stacked against it. Ground opposite lean is lifting slightly, indicating root failure.

CS #91 Two trees with fire scars leaning toward campsite. Discolored large pine behind campsite toward lake.

Between CS #93 and #94 Dead trees, both near picnic table. Large dead tree also behind campsite toward the lake but leaning toward campsite. One fork on large PP failed. The other fork is now weak. Two failed PP had root disease. Thinning crowns in other pine indicate possible root disease.

CS #95 Leaner with a fire scar. Thinning crowns in pine indicate possible root disease.

Between CS #94 and 96 Deformed base with a fire scar, also a leaner with a fire scar beyond small knoll. Thinning crowns in pine indicate possible root disease.

Dead pine tree between lava flow and ranger station.

BOAT LAUNCH

Two leaning trees.

TRAILHEAD

Several dead trees. JPB in JP and MPB in LPP.

BARN

Large LPP limbs broken off near barn. Several tree failures on service rd. to barn. JP and LPP.

DAY USE AREA

Tree failure into water near 4 picnic tables.

Three submerged pines - likely will die.

Submerged willows.

Tree with two dead tops.

Large dead limbs falling off in corner of day use parking loop near Bathtub Lakes sign.

Sap sucker pitch flows and very poor needle retention on old PP (36" dbh x 130' tall) in "island" surrounded by parking lot across road from bathroom. Another younger PP (@16" dbh x 60' tall) just west of the 36" PP has poor needle retention. Thinning crowns may indicate possible root disease. Both these PP are next to the road so soil compaction/root injury may be causing thin crowns.

Top killed pine up from day use area with sapsucker work.

Large pine with poor needle retention up from day use parking area. Monitor.

Dying PP (30" dbh) about 100' east of parking lot and next to fire ring has many dwarf mistletoe brooms.

A group of large PP about 200' upslope from the parking lot is heavily infested with dwarf mistletoe. One snag. The group has a basal area of 140 square feet.

A heavily stocked PP stand just west of the pine with heavy dwarf mistletoe has a basal area of 180. The PP in this stand are about 100' tall with 12" to 24" dbh's.

SERVICE ROAD TO TANK Several standing dead trees near road.

ENTRANCE ROAD Several standing dead trees near road.

In General:

JPB - no current mortality. Will likely lose some trees again during the next protracted drought period but would not recommend thinning any of the larger trees at this point.

Stocking level is fine in most places - might want to consider thinning some of the small clumps of Jeffrey pine that are < 8 in. dbh. to promote growth of the understory.

Some regeneration of pine in open areas but site is fairly occupied by large diameter JP.

Several trees with multiple tops may present a hazard at some point.

Expect continued tree mortality in the underburn area - limited bark beetle activity in burned area now but trees are dying primarily as a result of the fire-related injuries.

A few dead and/or other hazard trees and widow makers.

Needle discoloration and brooming is common, particularly in Loop A.

Need to remove large dead branches from trees over campsites and in the day use area.

If green trees or branches are removed, do not stack the green material against live trees - will attract Ips pini.